THE MURPHY CHEMICAL COMPANY LIMITED,
WHEATHAMPSTEAD,
HERTS., ENGLAND.

ADVISORY BULLETIN No. 11

ON

Derris

as an Insecticide.

KEEP THESE BULLETINS IN THE GRATIS FILING COVER WE SUPPLY.

DERRIS.

COMPOSITION.

This insecticidal material is the finely ground root of a small shrub belonging to the Leguminosæ. It is cultivated extensively in Straits Settlements, Sumatra, Borneo, Java and Sarawak, either as a sole crop or interplanted with rubber or kapok. From early times it has been known to the natives as "Tuba Root" and used as a fish poison. There are many species but the most important are *Derris elliptica* and *Derris malaccensis*. The main toxic principle is a complex organic substance known as Rotenone. The percentage of Rotenone in different samples and varieties of Derris varies considerably; for this reason the grower should buy only Derris Powder with guaranteed Rotenone content. For control of most pests a wash with Rotenone content of 0·0035 to 0·004% is advisable. If 2 lbs. of Derris Powder are used per 100 gallons of water, Rotenone content of Derris Powder should be 2%. The grower is advised, therefore, to demand that 2 lbs. of Derris Powder or 4 lbs. combined Derris and Spreader per 100 gallons water should give Rotenone content of diluted wash of desired standard of 0·0035 to 0.004%.

Derris Powder is frequently sold on guaranteed "ether-extract" figure, but the Rotenone content is generally considered a more reliable indication of toxic efficiency. Other toxic constituents are present with the Rotenone, but only this latter is so far capable of chemical estimation. A good sample of Derris Powder should have 15-20% "ether-extract" and generally, the higher this figure, the higher the Rotenone content.

FORMS OF DERRIS.

Finely ground Derris root can be used in several forms:—

(*a*) In conjunction with Soap or Spreader as wet spray on fruit trees and ground crops, etc., or for use on cattle for Warble Fly control.

(*b*) Made up as combined Derris and Spreader Powder for use as wet spray instead of (*a*) to save the trouble of making up separately Soap or Spreader solution.

(*c*) In combination with inert base for use as dusting powder on fruit trees, ground crops, etc. Such dust should contain not less than 0·2% Rotenone.

(*d*) As finely ground Derris Powder, used as such, on animals and poultry to control lice and fleas.

USES.

For general use, Derris, since it is non-poisonous, is employed to replace Lead Arsenate on fruits near time of picking and on other edible crops. It has also a specific action (not possessed by Lead Arsenate) against Weevils and Beetles. It can be used to replace Nicotine to control less resistant types of sucking insects, but unlike Nicotine, it is toxic to Red Spiders. When used as dust it remains toxic on the plant for at least four days. Used either as dust or wet spray it is not as quick-acting as Nicotine; the insect stops feeding, paralysis sets in and it dies in about forty-eight hours. Derris (like Nicotine) acts best on a warm, dry day, but such conditions are not as essential as they are in the case of Nicotine. When used as wet spray, Derris Powder should be mixed into a paste with a little water and added to the bulk of wash with continual stirring. The wash should be kept well agitated and applied without delay.

USE DERRIS TO CONTROL:—

(1) RASPBERRY and LOGANBERRY BEETLE.

Either wet sprays or dust can be used. (See Advisory Bulletin No. 4). Since publication of this Bulletin there has been evidence to show that two dustings (against adult beetles) just before flowers open, followed by one dusting 10-15 days after blossoming (against newly hatched larvæ) give better control than

three dustings applied before blossoming against the adult beetles. Dusting after blossoming ensures that if any beetles were not killed by the early applications, then the larvæ (hatching from eggs laid by them) will be destroyed. A dust applied at this date will not, as a rule, leave unsightly deposit on fruit.

(2) APPLE BLOSSOM WEEVIL.

Dusting only is effective; wet sprays are of no value. (See Advisory Bulletin No. 1). Satisfactory results have been obtained by use of Derris Dusts on bush trees and cordons, where weather conditions have been ideal.

(3) GOOSEBERRY SAWFLY LARVÆ.

Apply wet spray or dust as soon as larvæ are noticed. As dust, about 56 lbs. per acre per application are sufficient. Combined Sulphur-Derris Dusts for the simultaneous control of Sawfly and Mildew may also be used.

(4) RED SPIDERS on Apple, Plum and Hop.

Apply wet spray; dust is of little value. On apple, spray at petal fall and again, if necessary, ten days later. On plum, spray a fortnight after petal fall and again, if necessary, ten days later. (See Advisory Bulletin No. 9). On hops, there is evidence to show that Derris applied as a wet spray during latter part of June and again ten to fourteen days later, is of definite value against Red Spider.

(5) FLEA BEETLES (Turnip "Fly") on Cabbage, Cauliflower, Broccoli, Kale, Sugar Beet, Mustard, Mangold, Turnip, etc.

Dusts only are of value; wet sprays are useless. There are two aspects to the problem :- (a) Seedlings in special seed beds, which are later transplanted—generally Cabbage, Cauliflower, Broccoli, etc. In this case a fairly light dust used at about 50-60 lbs. per acre per application, applied by hand dusting machine, is advised. (b) Plants such as Mangold, Sugar Beet, Turnip, Cabbage, etc., sown direct in drills in the field. In this case the dust must be heavy, so that it can be applied by corn or man-

gold drill (with coulters raised just above level of seedlings) at rate of 30-40 lbs. per acre per application. It can also be applied by hand dusting machine.

The first application should be made when seedlings are just coming through and again four days later. In bad attacks, a third dusting is necessary four days after the second. The plants must be kept covered with thin coating of dust until first rough leaves appear; if dust is washed off by rain, the application should be repeated as soon as possible. The dust should be applied, if possible, in early morning of warm, still day. It is imperative that first application be made immediately beetles are seen on the plants. If seedlings are left unprotected at this stage they may be destroyed overnight. It is advisable to sow two or three small test plots of white turnip, a yard or so square, in corners of the field, about 3-5 days before crop is drilled. Watch these carefully, as soon as they come through. If they are attacked, the crop will probably suffer also. Therefore obtain a supply of Derris Dust, to be ready when main crop seedlings come through.

(6) MIGRATING LARVÆ OF APPLE SAWFLY.

Where possible, Apple Sawfly should be controlled in egg stage by Nicotine wash. Where this has not been done, about a quarter of crop is bound to be lost; remainder, however, can be saved by application of Derris Dust to fruits at rate of $\frac{1}{2}$-$\frac{3}{4}$ cwt. per acre per application, given about 14 days after petal fall and repeated a week later. (See Advisory Bulletin No. 3).

(7) STRAWBERRY BLOSSOM WEEVIL.

Dusts only are of value; wet sprays are useless. Use about 28 lbs. per acre per application; apply first when Weevils are seen on dandelion flowers in early May, and repeat six days later. Flower trusses must be kept covered with layer of dust to prevent Weevils ovipositing there; therefore, if dust is washed off by rain, application must be repeated as soon as possible.

(8) APPLE FRUIT TORTRIX CATERPILLARS.

The Caterpillars of this and other closely related species eat skin and surface layers of apple in late summer. Spraying or dusting at this date is not easy and, as yet, no definite experiments on control of this pest have been carried out. It is probable that either Derris or Nicotine, as dust or wet spray, applied during last ten days of July and again, if necessary, about fortnight later, will be of definite value.

(9) SUCKER (PSYLLA) on Apple and APHIS on Apple, Plum, bush fruits and other crops.

Use wet spray as soon as pest is first noticed. Rotenone content of washes for use against these pests need only be half standard strength. Derris Dusts are of little or no use.

(10) CATERPILLARS OF WINTER MOTH, MARCH MOTH, VAPOURER MOTH, LACKEY MOTH, ERMINE MOTH, MAGPIE MOTH, VARIOUS TORTRIX SPECIES, etc.

Apply wet spray or dust as soon as damage is noticed.

(11) LEAF EATING WEEVILS on Fruit Trees.

Wet sprays are of no value. Apply dust as soon as damage is noticed and repeat if necessary.

(12) CATERPILLARS OF CABBAGE MOTH, CABBAGE WHITE BUTTERFLIES AND OTHER CATERPILLARS on Edible Crops.

Apply wet spray, or dust at about 56 lbs. per acre per application, as soon as damage is noticed.

(13) CARAWAY MOTH, PEA & BEAN WEEVILS, MUSTARD BEETLES, FLEA BEETLES on Watercress and Hops.

These can be controlled by Derris Dust, but not by wet spray.

(14) LARVÆ OF WARBLE FLIES on Cattle.

The use of Derris in Soap solution is the only effective method for control of these pests. (Particulars on application).

(15) LICE AND FLEAS on Animals and Poultry.

Finely ground Derris root used as such or mixed with four parts of inert base gives effective control of these pests without harmful effect on animals or poultry.

(16) WASPS.

A handful of Derris Powder or Dust placed outside the nest will give effective control.

We do not recommend the use of Derris as wet spray against Apple Blossom Weevil, Flea Beetles, Strawberry Weevil, Leaf Eating Weevil, Capsid, Apple Sawfly and Plum Sawfly. Derris is also ineffective as a dust against Aphis, Sucker, Capsids or other Sucking Insects, and Red Spider.

SUMMARY.

Use Derris of Rotenone content about 2% as wet spray, at rate of 2 lbs. per 100 gallons water ; this should give diluted wash with Rotenone content of 0·0035 to 0·004%. This strength is required for most pests, but for Aphis and Sucker half this strength is enough. Use with Derris, 5-10 lbs. Soft Soap or a good Wetter and Spreader. Or, use Derris already combined with Spreader, at rate of 4 lbs. per 100 gallons to give Rotenone content in diluted wash of 0·0035 to 0·004%. Buy only Derris Powders which, used at these dilutions, give the desired standard percentage of Rotenone.

When purchasing Derris Dust for use on fruit trees, see that it has a guaranteed minimum Rotenone content of 0·2%.

March, 1935.

We supply :—

GARANTONE DERRIS POWDER.

Guaranteed 2% Rotenone content ; used at 2 lbs. per 100 gallons will give desired standard of 0·0035 to 0·004% Rotenone.

MORTO Combined Derris and Spreader.

Guaranteed Rotenone content ; used at 4-lbs. per 100 gallons will give a wash of desired standard of 0·0035 to 0·004% Rotenone.

MURPHY'S 100% DERRIS POWDER.

For wet spraying, guaranteed "ether-extract" 17-20%

ROTOMORT DERRIS DUST.

Guaranteed Rotenone content of 0·2%

MORTINONE DERRIS DUST.

For use on ground crops for Flea Beetle, etc.

ALVESCO INSECTICIDE SOAP.

For use with Garantone or with 100% Derris Powder for wet spraying.

SPREADITE.

Wetter, Spreader, Sticker and Penetrant for use where Soap is not desired.